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Further new or interesting lichens and lichenicolous fungi from La Palma (Canary Islands, Spain)

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Abstract: Forty-five taxa of lichens and lichenicolous fungi are recorded from La Palma for the first time. Twelve are new to the Canary Islands archipelago. One further species, *Didymocyrtis canarienis*, is described as new for science. The total number of known taxa from the island La Palma has raised to 874. An alphabetical annotated species list of all taxa with collection localities, substrate and occasional further annotations is presented.

Keywords: *Ascomycetes*; biodiversity; distribution; substrata; taxonomy; mycobiota of Macaronesia

INTRODUCTION

Together with El Hierro, La Palma is the most western island of the Canary Island archipelago (Fig. 1). The lichens and lichenicolous fungi of La Palma have received considerable attention in recent years. For a survey of literature see Hernández-Padrón & Pérez-Vargas (2010), with 752 records, and Van den Boom (2007), in which 47 additional species are recorded from La Palma. A record of *Tephromela folmanii* Pérez-Vargas, Hern.-Padr. & Elix was published by Pérez-Vargas et al. (2010a), *Usnea chaetophora* Stirt. by Pérez-Vargas et al. (2010c), *Vahliella isidioidea* Pérez-Vargas, C. Hdez.-Padr., van den Boom & P. M. Jørg., from La Palma was added by Pérez-Vargas et al. (2014), *Diploschistes albopruinosus* Pérez-Vargas, C. Hdez.-Padr. & Elix was described by Pérez-Vargas et al. (2012b), Pérez-Vargas et al. (2015a) described *Caloplaca nigrocarpa* Pérez-Vargas & C. Hdez.-Padr., Pérez-Vargas et al. (2015b) record 7 new *Cladonia* species, and 17 additional *Buellia* s. l. records have been found in Giralt & Van den Boom (2011), making a total of 828 species.

Here we bring results from fieldwork by the first author and his wife mainly in the eastern part of the island, in autumn of 2012 (for the locality list see below). The material of the genus *Usnea* was subjected to a detailed study by one of us (PC), who checked many specimens of which five are new records for the island. Totally forty-five taxa are recorded for the first time for the island. Twelve species are unrecorded for the Canary Islands archipelago before. One further species, *Didymocyrtis canarienis* van den Boom & Etayo, is described as new for science. They all are presented here. The study of our material revealed 46 additional new taxa for the island, raising the total number to 874.

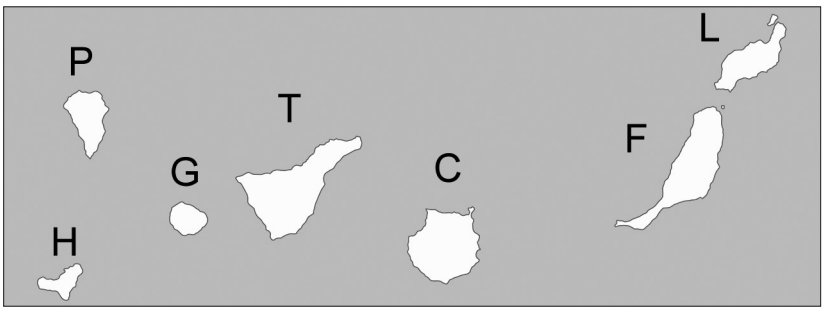

Fig. 1. Schematic map of the Canary Islands with the situation of La Palma (P). The other islands are: Gran Canaria (C), Fuerteventura (F), El Hierro (H), La Gomera (G), Lanzarote (L) and Tenerife (T).

MATERIALS AND METHODS

More than 500 specimens of lichens and lichenicolous fungi were examined, collected by the first author and his wife on volcanic rock, on soil and on trees and shrubs, in 15 localities, mainly in the eastern part of the island La Palma. To establish whether a record is new for La Palma or the Canary Islands, the most recent checklist for lichens and lichenicolous fungi of the Canary Islands, Hernández-Padrón & Pérez-Vargas (2010), was consulted and indicated as H-2010 below. The following more recent publications were also checked: Aptroot & Schumm (2012), van den Boom (2010, 2013), van den Boom & Clerc (2015), van den Boom & Ertz (2012), van den Boom & Etayo (2017), van den Boom et al. (2015), Giralt & van den Boom (2011), Montelongo et al. (2015), Pérez-Vargas & Pérez-Ortega (2014), Pérez-Vargas et al. (2010b, 2010d, 2011, 2012a, 2012b, 2013, 2014, 2015a, 2015b) and Tehler et al. (2013).

Chemical constituents were identified by the standard methods of thin-layer chromatography (TLC) according to Orange et al. (2010). Some specimens were checked by specialists, as noted under the pertinent species. The indicated voucher specimens are kept in the private herbarium of P. van den Boom (herbarium numbers between 48300 and 49000), the type specimen and duplicates of all specimens mentioned below are kept in TFC.

Sampling localities on La Palma

1 – 3.5 km WSW of Los Sauces, Los Tilos, laurisilva, narrow cleft with path along N facing volcanic outcrops, between tunnel and Mirador, 28°47.10'N, 17°48.60'W, 750 m, 27 October 2012.

2 – Mazo, shop of Ceramics 'El Molino' and small botanical garden, on stones of wall and wood of roof, 28°36.60'N, 17°46.40'W, 335 m, 28 October 2012.

3 – SW of Breña Alta, SW of San Isidro, N side of road LP203/LP301, trail Camino de la Cumbre (PR LP18.2), to El Llanito, small forest with *Erica*, *Laurus* and *Myrica* and small orchard with *Juglans*, 28°38.00'N, 17°48.50'W, 760 m, 28 October 2012.

4 – SW of Breña Alta, SW of San Isidro, along road LP203/LP301, between Pared Vieja and El Pilar (halfway), just a few meters in forest with *Erica*, *Laurus* and *Myrica* a ruderal place with bones on the ground, 28°37.00'N, 17°49.30'W, 1170 m, 28 October 2012.

5 – SW of Breña Alta, SW of San Isidro, along road LP203/LP301, between Pared Vieja and El Pilar, near house, few hundred meters west of crossing, at roadside, rim of forest with mainly *Erica* and *Laurus*, including some terricolous lichens, 28°36.80'N, 17°49.20'W, 1410 m, 28 October 2012.

6 – SW of Breña Alta, SW of San Isidro, near road LP203/LP301, 1 km west of El Pilar, trail LP17, started near barn, open forest with mature *Pinus* trees and small *Erica* shrubs, 28°36.60'N, 17°49.70'W, 1440 m, 28 October 2012.

7 – 3.5 km WSW of Los Sauces, Los Tilos, laurisilva, steep trail from visitors centre to mirador de las Barandas, poor in macro lichens, 28°47.70'N, 17°47.90'W, 750 m, 29 October 2012.

8 – 3.5 km WSW of Los Sauces, Los Tilos, laurisilva, trail from mirador de las Barandas, to Laguna de Barlovento, first 100 m, with ruderal places, poor in macro lichens, 28°47.80'N, 17°47.95'W, 755 m, 29 October 2012.

9 – SW of Los Sauces, W of Lomadas, trail from Los Cancelas (LP6) to (direction of) Casa del Monte, with mostly ruderal places, mainly in 'fayal brezal', many young trees, some *Laurus* and *Ilex*, poor in macro lichens, 28°47.26'N, 17°47.35'W, 700 m, 29 October 2012.

10 – W of La Galga, Cubo de La Galga, laurisilva in big valley with shaded steep volcanic outcrops, 28°45.60'N, 17°47.00'W, 650 m, 31 October 2012.

11 – SW of Breña Alta, SW of San Isidro, N side of road LP203/LP301, 'Pared Vieja' picnic place, open area with a few mature *Pinus* trees and trail in open forestry area with stumps, *Erica*, *Laurus* and *Myrica*, 28°37.10'N, 17°49.70'W, 1260 m, 1 November 2012.

12 – SW of Breña Alta, SW of San Isidro, N side of road LP203/LP301, E of Refugio El Pilar, near pole of brick with chain as a fence, trail in forest with mature *Pinus* trees, 28°36.60'N, 17°49.90'W, 1450 m, 1 November 2012.

13 – SW of Breña Alta, SW of San Isidro, S road LP203/LP301, opposite mirador 'observa-

toric', trail in forest with *Erica*, *Laurus* and *Myrica,* 28°36.80'N, 17°49.40'W, 1330 m, 1 November 2012.

14 – SW of Breña Alta, SW of San Isidro, S of Pared Vieja, S side of road LP203/LP301, small trail in forest with *Erica*, *Laurus*, *Myrica* and rich in terricolous lichens, 28°36.60'N, 17°49.30'W, 1245 m, 1 November 2012.

15 – SW of Breña Alta, 2.8 km SW of San Isidro, N side of road LP203/LP301, some mature *Pinus* trees with many broken branches, 28°37.60'N, 17°48.60'W, 900 m, 1 November 2012.

RESULTS

New species

***Didymocyrtis canariensis* van den Boom & Etayo sp. nov. (Fig. 2)**

MycoBank no.: MB 822253

Diagnosis: Species lichenicolous on *Ramalina subgeniculata*; perithecia immersed, dark brown to black, subglobose to globose, up to 250 µm diam.; ascomatal wall 10–15 µm thick; asci cylindrical to slightly clavate, 75–95 × 7–9 µm; ascospores obliquely monostichous in the asci, ellipsoid, fine warted, brown, 1-septate, 9–11(–12) × 4.5–5.5 µm. Conidiomata immersed, black, subspherical 100–150 µm diam., wall dark brown, 2–3 layers of cells, cells angular up to 8–10 µm wide; conidia broadly ellipsoid to slightly ovoid, subspherical, with one large guttule, 4.5–5.5 × 3.5–4 µm.

Type: SPAIN, Canary Islands, La Palma, N of Santa Cruz, W of La Galga, Cubo de La Galga, laurisilva, in a big valley with shaded steep volcanic outcrops, on fallen *Castanea* tree, 28°45.6'N, 17°47.0'W, 650 m, 31 October 2012, P. & B. van den Boom 48685 (TFC, holotype; hb. van den Boom, hb. Etayo, isotype).

Description: Ascomata lichenicolous, perithecioid, scattered, subglobose to globose, sometimes flattened, immersed, with visible ostiole, in section up to 250 µm in diam.; ascomatal wall pale to medium brown, consisting of about 3-6 layers of cells, c. 10–15 µm thick, composed of angular cells, cells up to 12 µm wide; hamathecial filaments present at maturity, sometimes branched and anastomosing, 1–1.5(–2) µm thick, hymenial gelatine I–; asci narrowly cylindrical to slightly clavate, apically thickened when mature, with a small ocular chamber, ascal wall I– and KI– in all parts, 8-spored, 75–95 × 7–9 µm; ascospores obliquely monostichous in the asci, sometimes slightly overlapping, ellipsoid, mostly constricted at the septum, when young hyaline to pale brown without a perispore, soon dark brown, fine warted when mature, 1-septate, septum sometimes formed towards

Fig. 2. Holotype (TFC Lich 16041). A – habitus, perithecia in thallus of *Ramalina*. B – ascospores in ascus. Scale: A – 0.2 mm; B – 10 µm.

the lower end of the ascospores, 9–11(–12) × 4.5–5.5 µm; conidiomata immersed, black, subspherical, 100–150 µm diam., wall dark brown, 2–3 layers of cells, cells angular, up to 8–10 µm wide; conidia broadly ellipsoid to slightly ovoid, subspherical, with one large guttule, 4.5–5.5 × 3.5–4.5 µm.

Etymology: The epithet refers to the archipelago where the species occurs.

Distribution and ecology: So far, known from three islands of the Canary Islands archipelago, Gran Canaria, La Gomera and La Palma including the type locality, occurring on *Ramalina subgeniculata*, on bark of an fallen *Castanea* tree at 650 m altitude. It does most probably not damage the host; the colour of the host turns not or slightly paler. All the known collections are from the same host species, *R. subgeniculata*, or what has been mentioned as *Ramalina* sp. but these refer most probably also to *R. subgeniculata*. Other lichenicolous fungi, found close to the new species, are *Lichenoconium erodens* M.S. Christ. & D. Hawksw., *Lichenopeltella ramalinae* Etayo & Diederich and *Tremella ramalinae* Diederich, in specimens 49025, 22228 and 48562 (hb. van den Boom) respectively.

Notes: Most of the species of *Didymocyrtis* are recorded from macrolichens (Ertz et al., 2015) and following the identification key to species of *Didymocyrtis* in that study, the new species is most similar to *D. infestans* (Speg.) Hafellner, a species known to occur on *Teloschistes* and differing by larger ascomata (250–350 µm diam.), developing in the hymenium and/or thallus branches of the host, immersed, finally somewhat protruding. This latter character has never been observed in the new species. The new species has been found on thallus and apothecium margin of the host but never in the hymenium. Two species are known from crustose host lichens, *Caloplaca* and *Lecanora*. *Didymocyrtis bryonthae* (Arnold) Hafellner known from *Lecanora epibryon*, has ascomata often developing in the hymenium but also in thallus branches, immersed, finally somewhat protruding, it has somewhat longer ascospores, 11.5–14 × 4–5 µm, but the ascomata are smaller, 150–200(–250) µm diam., immersed in apothecia that turns black and asci are shorter, 60–80 × 7–10 µm. *Didymocyrtis consimilis* Vain., known from *Caloplaca*, has ascospores of 12–15 × 5–6 µm, hardly constricted at the septum, with a verruculose sculpture hardly visible in light microscopy and the ascomata are much smaller than in the new species (70–)100–150 µm diam. *Didymocyrtis ramalinae* (Roberge ex Desm.) Ertz, Diederich & Hafellner looks rather similar in habitus, but that species has 3-septate ascospores, 14–20 × 5–6.5 µm, conidiomata immersed in pale necrotic areas of the thallus or apothecial margin surrounded by a black line, black, subspherical, 105–135 µm diam.; conidia ellipsoid, biguttulate, with a small guttule near each apex, 5–7 × 3–4 µm and it is widely distributed in Europe and known from Africa and Australia (Ertz et al., 2015). A further similar species, *Endococcus ramalinarius* (Lindsay) D. Hawksw., has ascospores clearly constricted at the septum, 10–13 × 4–4.5 m and it is growing on *Ramalina leidoea* in New Zealand. Hawksworth (1979) lectotypified and discussed this species.

Additional specimens examined: SPAIN, Canary Islands, La Palma, 3.5 km WSW of Los Sauces, Los Tilos, laurisilva, narrow cleft with path along steep N facing rock, between tunnel and Mirador, on unidentified tree, 28°47.5'N, 17°48.1'W, 700 m, 3 May 1999, P. & B. van den Boom 22228 (hb. v.d. Boom); SW of Los Sauces, W of Lomadas, trail from Los Cancelas (LP6) to (direction of) Casa del Monte, with mostly ruderal places, mainly in 'fayal brezal', many young trees, some *Laurus* and *Ilex*, 28°47.26'N, 17°47.35'W, 700 m, 29 October 2012, P. & B. van den Boom 48562 (hb. v.d. Boom); La Galga, Cubo de La Galga, on *Ramalina* sp. on *Myrica faya*, 13 August 1995, J. Etayo 14032 (hb. Etayo). Gran Canaria, SE of Gáldar, E of Moya, along road near El Palmital, fayal-brezal, N side of road with many *Cladonia mediterranea* and S side of the road with acidic outcrops, on *Hypericum*, 28°6.69'N, 15°36.2'W, 500 m, 8 February 2013, P. & B. van den Boom 49025 (hb. v.d. Boom). La Gomera, riscos encima de Tagaluche, por pista Encherada, on unidentified shrub, 650 m, 22 July 2000, J. Etayo 17754 (hb. Etayo); road from San Sebastián to Hermigua, 2 km from the village, pinar, on *Ramalina* sp. on *Pinus*, 2 August 1994, J. Etayo 13839 (hb. Etayo).

Annotated species list

Species new to the Canary Islands are marked with *; the islands are abbreviated as follows: Gran Canaria (C), Fuerteventura (F), El Hierro (H), La Gomera (G), Lanzarote (L), La Palma (P) and Tenerife (T).

*Bacidina brittoniana (Riddle) LaGreca & Ekman – Loc. 1, on *Ocotea*, 48384, identified by S. Ekman.

Bacidia viridifarinosa Coppins & P. James – Loc. 1, on volcanic rock, 48347; 1, on exposed roots, 48371. The first specimen is fertile.

Buellia stellulata (Taylor) Mudd – Loc. 2, on stone of wall, 48397. In Giralt & van den Boom (2011) it is recorded from C, F, H, L and T.

*Caloplaca asserigena (Lahm.) H. Oliver – Loc. 5, on unidentified shrub, 48442; 14, on unidentified shrub, 48780.

Catillaria usneicola Etayo – Loc. 15, on *Pinus*, 48814, on *Usnea*. Known from G and H (van den Boom & Ertz, 2012).

*Cladonia conista Robbins ex A. Evans – Loc. 11, terricolous, 48724, identified by T. Ahti & R. Pino. This species belongs to the *Cladonia humilis* complex, but our specimen contains protocetraric acid, fumarprotocetraric acid and bourgeanic acid.

Cladonia floerkeana (Fr.) Flörke – Loc. 6, on *Pinus*, 48495. Previously only known from El Hierro (van den Boom & Ertz, 2012) and from Tenerife (Pérez-Vargas et al., 2015b).

Cladonia nana Vain. – Loc. 9, terricolous, 48536, identified by T. Ahti & S. Stenroos. This specimen contains protocetraric acid, fumarprotocetraric acid. In van den Boom & Ertz (2012) this species is published as an uncertain record.

Cladonia polydactyla (Flörke) Sprengel – Loc. 12, on *Pinus*, 48737, 48749; 6, on *Pinus,* 48492. Known from C (van den Boom & Clerc, 2015) and from La Gomera (van den Boom et al., 2015).

Cliostomum griffithii (Sm.) Coppins – Loc. 4, on *Erica*, 48426; 15, on *Pinus,* 48803; Only known from H (van den Boom & Ertz, 2012), where it is rather common.

Everniastrum sorocheilum (Vain.) Hale & Sipman – Loc. 5, on *Erica*, 48435.

Graphis scripta (L.) Ach. – Loc. 1, on bark of fallen trunk, 48333.

Hypotrachyna afrorevoluta (Krog & Swinscow) Krog & Swinscow – Loc. 5, on unidentified shrub, 48450, known from H (van den Boom & Ertz, 2012) and from G (van den Boom et al., 2015).

Hypotrachyna rockii (Zahlbr.) Hale – Loc. 10, on bark of fallen branch, 48671.

*Koerberia biformis A. Massal. – Loc. 9, on *Ilex*, 48540.

Lambinonia strigulae (Elenkin & Woronichin) Sérusiaux & Diederich – Loc. 1, on leaf of *Laurus*, on *Strigula*, 48353; 10, on leaf of *Ocotea*, on *Strigula*, 48644.

Lecania naegelii (Hepp) Diederich & van den Boom – Loc. 9, on *Ilex*, 48556.

*Lecanora farinaria Borrer – Loc. 12, on *Pinus* branch, 48742; 14, on unidentified shrub, 48779, 48796, identified by T. Tønsberg.

Lecanora strobilina (Spreng.) Kieff. – Loc. 15, on branch of *Pinus,* 48804.

*Lecanora subsaligna Brand & van den Boom – Loc. 14, on unidentified shrub, 48798.

Lecidea erythrophaea Flörke – Loc. 9, on *Ilex*, 48554, known from G (H-2010).

Lecidella euphorea (Flörke) Hertel – Loc. 3, on *Juglans*, 48414.

Lepraria finkii (B. de Lesd.) R. C. Harris – Loc. 13, on sloping soil, 48766; 4.5 km WSW of Los sauces, Los Tilos, laurisilva, narrow cleft over Barranco del Agua, on *Erica arborea*, 800 m, 3 May 1999, P. & B van den Boom 22296, identified by T. Tønsberg.

Lepraria umbricola Tønsberg – Loc. 3, on exposed roots, 48402; 7, on *Myrica faya*, 48512; on overhanging base of *Laurus*, 48581, identified by T. Tønsberg. Recently recorded as new to the Canary Islands (La Gomera) by van den Boom et al. (2015).

*Leptogium coralloideum (Meyen & Flot.) Vain. – Loc. 10, on bark of fallen branch, 48641.

*Malmidea fuscella (Müll. Arg.) Kalb & Lücking – Loc. 1, on unidentified tree, 48312, 48342; 1, on fallen tree, 48338, identified by R. Lücking. Portugal, Madeira, NE of Funchal, W of Portela, trail to the west, along levada, in laurisilva area with mature *Acer* trees along the trail, 32°44.68' N, 16°49.92' W, 665m, 28 April 2012, on *Laurus*, 47690; NW of Funchal, road (ER228) from Ribeira Brava to São Vicente, c. 1 km N of Boca da Encumeada, trail PR22 'Vereda do Chao dos Louros', along laurisilva, 32°45.50' N, 17°1.10' W, 880 m, 30 April 2012, on *Laurus*, 47798.

Micarea peliocarpa (Anzi) Coppins & R. Sant. – Loc. 14, on unidentified shrub, 48790.

Pertusaria pupillaris (Nyl.) Th. Fr. – Loc. 12, on *Pinus*, 48748, identified by T. Tønsberg.

Pertusaria pustulata (Ach.) Duby – Loc. 10, on *Castanea*, 48686.

*Phaeophyscia endococcina (Körb.) Moberg – Loc. 7, on acidic rock, 48500.

*Ramboldia subcinnabarina (Tønsberg) Kalb, Lumbsch & Elix – Loc. 12, on fallen branch of *Pinus*, 48734, 48744. This species was previously only known from Norway, western USA and Canada (British Columbia), identified by T. Tønsberg.

Rinodina biloculata (Nyl.) Sheard – Loc. 14, on unidentified shrub, 48788, 48797. In H-2010 it is recorded from G.

*Scoliciosporum gallurae Vězda & Poelt – Loc. 15, on branch of *Pinus*, 48818.

*Stigmidium cladoniicola Zhurb. & Diederich – Loc. 11, on *Pinus*, 48703, on *Cladonia* sp.

Thelotrema laurisilvae Lücking & Breuss – Loc. 1, on unidentified tree, 48329.

Topelia rosea (Serv.) P. M. Jørg. & Vězda – Loc. 1, on volcanic rock, 48313.

Trapelia corticola Coppins & P. James – Loc. 4, on *Erica*, 48418; 11, on stump, 48725,48728; 13, on wood, 48765. Known from G and T (H-2010).

Trapelia glebulosa (Sm.) J. R. Laundon – Loc. 11, terricolous, 48717. Recorded as *T. involuta* from G and T (H-2010).

Trapeliopsis pseudogranulosa Coppins & P. James – Loc. 12, on *Pinus*, 48738, known from G and T (H-2010).

Tremella ramalinae Diederich – Loc. 9, on *Laurus*, 48561, on *Ramalina*; 9, on *Ilex*, 48553, on *Ramalina*.

Usnea flavocardia Räsänen – Loc. 5, on *Erica*, 48469, 48474, 48477, 48481, 48483, 48485; 15, on branch of *Pinus*, 48802. From G, H and T recorded in H-2010. From C it is recorded in van den Boom & Clerc (2015).

Usnea fragilescens Lynge – Loc. 11, on branch of *Pinus*, 48684. Recorded from T (H-2010).

Usnea geissleriana P. Clerc – Loc. 11, on mature *Pinus*, 48706. Recorded from G, H and T (H-2010).

Usnea glabrata Vain. – Loc. 11, on branch of *Pinus*, 48689. Only recorded from T (H-2010).

Usnea macaronesica P. Clerc – Loc. 11, on branch of *Pinus*, 48684. Recorded from G, H and T (H-2010).

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Errata

In the paper about Gran Canaria, lichens and lichenicolous fungi (van den Boom 2010: 365), *Pterygiopsis hassei* Fink is listed (under *Zwackhiomyces heppiae*). Such name does not exist, so it is a clerical error. The name refers to *Psorotichia hassei* Fink., identified by Dr. Matthias Schultz, under this correct name.

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